

ACSI Material Safety Data Sheet

ST-22 Positive Resist Stripper

MSDS No. 44003

Date of Preparation: April 1, 1996

Revision Date: 5/13/98 Revision: A-2

Section 1 - Chemical Product and Company Identification

Product/Chemical Name: ST-22 positive Resist Stripper
Chemical Formula: Not applicable
Other Designations: None
General Use: Photoresist stripping
Manufacturer: ACSI, Inc., 510 Alder Drive, Milpitas, CA 95035-7443
 Phone: 408-321-8900
 FAX: 408-321-9321
 Hours of operation: 9 A.M. to 5 P.M. (P.S.T.)
 CHEMTREC 24 Hour Emergency Phone Number: 800-424-9300

Section 2 - Information on Hazardous Ingredients (This may not be a complete list of components)

Ingredient Name	CAS Number	% vol
Butyrolactone	96-48-0	≤ 15
2-(2-Aminoethoxy)ethanol	929-06-6	≤ 45
1-Methyl-2-pyrrolidinone	872-50-4	≤ 40
Proprietary organic solvent	Proprietary	≤ 30

Ingredient	OSHA PEL		ACGIH TLV		NIOSH REL		NIOSH
	TWA	STEL	TWA	STEL	TWA	STEL	IDLH
Butyrolactone	none estab.	none estab.	none estab.	none estab.	none estab.	none estab.	none estab.
2-(2-Aminoethoxy)-ethanol	none estab.	none estab.	none estab.	none estab.	none estab.	none estab.	none estab.
1-Methyl-2-pyrrolidinone	none estab.	none estab.	none estab.	none estab.	none estab.	none estab.	none estab.
Proprietary organic solvent	none estab.	none estab.	none estab.	none estab.	none estab.	none estab.	none estab.

Section 3 - Hazards Identification

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Clear, combustible liquid. Causes skin and eye burns. Vapors extremely irritating to eyes and respiratory tract.

Potential Health Effects

Target Organs: Skin, eyes, lungs, central nervous system

Acute Effects

Inhalation: Inhalation of vapors or mists causes irritation and burns of the eyes, nose, and respiratory tract. Exposure to high concentrations of butyrolactone may cause narcosis. Prolonged or repeated exposure to 2-(2-aminoethoxy)ethanol may result in lung damage. 1-methyl-2-pyrrolidinone if misted or at high concentrations may cause pallor, nausea, anesthetic or narcotic effects. If misted, the proprietary organic solvent causes stupor and sudden loss of consciousness, possibly leading to death.

Eye: Causes severe burns of the eye. Direct contact with the liquid or exposure to vapors or mists may cause stinging, tearing, redness, swelling, corneal damage, eye burns, and irreversible eye damage including corneal damage which may result in vision impairment or even blindness.

Skin: Causes severe burns of the skin. Direct contact or exposure to vapors or mists can be severely irritating to the skin and may result in redness, swelling, burns, and severe skin damage. Butyrolactone may cause narcosis if absorbed through skin in significant quantities.

Ingestion: Harmful if swallowed. Ingestion may cause gastrointestinal irritation or ulceration. Ingestion may cause burns of the mouth and throat. If butyrolactone is ingested in significant quantities, dulling of senses may occur. 2-(2-aminoethoxy)ethanol may cause stomach burns with abdominal and chest pain, vomiting, diarrhea, thirst, weakness and collapse. The proprietary organic solvent may cause irritation of the mouth and throat, nausea and vomiting, possibly leading to convulsions.

Carcinogenicity: IARC, NTP, and OSHA do not list any components as carcinogens.

Medical Conditions Aggravated by Long-Term Exposure: Persons with pre-existing skin disorders may be more susceptible to the effects of this material.

Chronic Effects: Repeated inhalation of 2-(2-aminoethoxy)ethanol may cause lung damage.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Keep victim warm and quiet.

Eye Contact: Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

Skin Contact: Immediately flush with large amounts of cool water for at least 15 minutes. Remove contaminated clothing. Launder contaminated clothing before re-use. Discard shoes saturated with this product.

Ingestion: DO NOT induce vomiting. Vomiting will cause further damage to throat. If conscious, dilute by giving water. Give milk of magnesia. Keep victim warm and quiet.

Seek immediate in-plant, paramedic, or community medical support for all medical emergencies..

Note to Physicians: The decision whether to induce vomiting or not should be made by an attending physician. 2-(2-aminoethoxy)ethanol is corrosive to digestive tract. The proprietary organic solvent is considered a poison.

Section 5 - Fire-Fighting Measures

Flash Point: 103 °C **Flash Point Method:** TCC (ATSM Standard D 56)

Flash Point: 110 °C **Flash Point Method:** Open Cup

Autoignition Temperature: 270 °C (For 1-methyl-2-pyrrolidinone)

LEL: 1.30% v/v (For 1-methyl-2-pyrrolidinone)

UEL: 9.50% v/v (For 1-methyl-2-pyrrolidinone)

Flammability Classification: Combustible

Extinguishing Media: Use alcohol foam, carbon dioxide, dry chemical, or water spray when fighting fires involving this material.

Unusual Fire or Explosion Hazards: None listed

Hazardous Combustion Products: May form carbon monoxide, carbon dioxide, ammonia, or nitrogen oxides. Aldehydes and ketones may be formed when burned in a limited air supply.

Fire-Fighting Instructions: Do not release runoff from fire control methods to sewers or waterways.
Fire-Fighting Equipment: Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full face piece operated in pressure-demand or positive-pressure mode.

Section 6 - Accidental Release Measures

Spill /Leak Procedures:

Small Spills: Wearing appropriate personal protective equipment, contain the spill. Absorb spill with inert material (e.g. dry sand or earth). Dispose of according to federal, state and local regulations. Containers should be properly labeled.

Large Spills: Shut off and eliminate all ignition sources. Personnel not wearing protective equipment should be excluded from area of spill until clean-up is completed. Stop spill at source. Dike to prevent spreading. Pump to salvage tank. Add sand, earth, or other suitable absorbent to remaining spill and dispose of in accordance with federal, state, and local regulations.

Regulatory Requirements: Follow applicable EPA (40 CFR) and OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Do not get in eyes, on skin, or on clothing. Do not breathe mist or vapors. Use only in well-ventilated areas. Wash thoroughly after handling. Since emptied containers contain product residues, all hazard precaution given in this data sheet must be observed. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death. Empty drums should be completely drained, properly bunged, and promptly returned to a drum reconditioner, or properly disposed of.

Storage Requirements: Store in a cool, dry area. Keep away from heat, sparks, and flame. Keep container closed.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls:

Ventilation: Provide general or local exhaust ventilation systems to maintain airborne concentrations below OSHA PELs (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

Administrative Controls:

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or non-routine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Protective Clothing/Equipment: Wear chemically protective gloves such as polyvinyl chloride, neoprene, butyl rubber, or natural latex, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Wear chemical splash goggles and face shield per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Safety Stations: Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Contaminated Equipment: Separate contaminated work clothes from street clothes. Launder before reuse. Remove this material from your shoes (properly dispose if saturated) and clean personal protective equipment.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9 - Physical and Chemical Properties

Physical State: Liquid	Specific Gravity (H₂O=1, at 4 °C): 1.05
Appearance and Odor: Clear with slight ammonia odor.	pH: 12 (10% aqueous solution)
Vapor Pressure: < 1 mm Hg at 20 °C	Water Solubility: complete
Vapor Density (Air=1): 3 - 3.6	Boiling Point: 215 °C @ 760 mm Hg
Formula Weight: Not applicable	% Volatile: ≤ 80
Density: 0.95	Evaporation Rate: (butyl acetate = 1)

Section 10 - Stability and Reactivity

Stability: Stable at room temperature in closed container under normal handling conditions.

Polymerization: Hazardous polymerization cannot occur.

Chemical Incompatibilities: Strong oxidizers and acids.

Conditions to Avoid: Do not store in unmarked containers.

Hazardous Decomposition Products: Carbon dioxide, carbon monoxide, possible nitrogen oxides.

Section 11- Toxicological Information

Toxicity Data:*

Skin Effects:

Butyrolactone
 skn-mus TD_{Lo}: 50 g/kg 142-W-I:ETA

2-(2-Aminoethoxy)ethanol
 skn-rbt 10 mg/24 H open SEV
 skn-rbt LD₅₀: 1190 mg/kg

1-Methyl-2-pyrrolidinone
 skn-rat TD_{Lo}: 7500 mg/kg (female 6-15D post): REP
 skn-rbt LD₅₀: 8000 mg/kg

Proprietary organic solvent
 skn-rbt 500 mg/24 H SEV
 skn-rbt LD₅₀: 1600 mg/kg

Acute Oral Effects:

Butyrolactone
 orl-rat TD_{Lo}: 25 g/kg (20D male):REP
 orl-rat LD₅₀: 1540 mg/kg
 orl-mus LD₅₀: 1720 mg/kg

2-(2-Aminoethoxy)ethanol
 orl-rat LD₅₀: 5660 mg/kg

1-Methyl-2-pyrrolidinone
 orl-rat LD₅₀: 3914 mg/kg
 orl-mus LD₅₀: 5130 mg/kg

Proprietary organic solvent
 orl-rat LD₅₀: 370 mg/kg

Acute Inhalation Effects:

Proprietary organic solvent
 ihl-rat LC₅₀: 120 ppm/1H

Eye Effects:

2-(2-Aminoethoxy)ethanol
 eye-rbt 250 µg open SEV
 1-Methyl-2-pyrrolidinone
 eye-rbt 100 mg MOD
 Proprietary organic solvent
 eye-rbt 100 mg SEV

Carcinogenicity: None listed**Mutagenicity:**

Butyrolactone
 dnd-bcs 20 µL/disc
 otr-rat: kdy 25 mg/L
 1-Methyl-2-pyrrolidinone
 sln-smc 154 mmol/L

Teratogenicity:

Butyrolactone
 orl-rat TD_{LO}: 500 mg/kg (female 6-15D post):TER
 1-Methyl-2-pyrrolidinone
 orl-rat TD_{LO}: 9700 mg/kg (female 6-15D post):TER

* Information taken from Sax's Dangerous Properties of Industrial Materials (8th Edition).

Section 12 - Ecological Information

Movement and Partitioning: None listed

Degradation and Transformation: None listed.

Ecotoxicology: The LC₅₀ for 1-Methyl-2-pyrrolidinone in the most sensitive species is > 800 mg/L.

Butyrolactone has a 48 hour LC₅₀ of 100-500 mg/L for a minnow. Its aquatic toxicity rating is 96 hour TLM > 1000 mg/L.

Environmental information for 2-(2-Aminoethoxy)ethanol and the proprietary organic solvent is not available.

Section 13 - Disposal Considerations

Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

Container Cleaning and Disposal: Containers of this material may be hazardous when emptied. Since emptied containers contain product residues, all hazard precaution given in this data sheet must be observed.

Section 14 - Transport Information

DOT Transportation Data (49 CFR 172.101):

Shipping Name: 2-(2-Aminoethoxy)ethanol

Hazard Class: Class 8-Corrosive

ID No.: UN 3055

Packing Group: III

Label: Corrosive

Special Provisions (172.102): T2

Section 15 - Regulatory Information

EPA Regulations:

RCRA Hazardous Waste Number(40 CFR 261.33): None listed

RCRA Hazardous Waste Classification (40 CFR 261.??): None specifically classified. May apply depending upon the nature of the waste.

CERCLA Hazardous Substance (40 CFR 302.4) listed specific per RCRA, Sec. 3001; CWA, Sec. 311 (b)(4); CWA, Sec. 307(a), CAA, Sec. 112: None listed

CERCLA Reportable Quantity (RQ): None listed

SARA 311/312 Codes: Immediate (acute) health hazard

SARA Toxic Chemical (40 CFR 372.65): None listed

SARA EHS (Extremely Hazardous Substance) (40 CFR 355) Threshold Planning Quantity (TPQ):
None listed

SARA Title III Section 313 Reporting Requirements

1-Methyl-2-pyrrolidinone

OSHA Regulations:

Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): None listed

State Regulations: (The following substances are specifically listed in the state regulations. In some cases chemicals are not listed, but are regulated in broader terms by the states. See state regulations for details.)

California Proposition 65 Chemicals: None listed

Massachusetts Substance List:

2-(2-Aminoethoxy)ethanol

1-Methyl-2-pyrrolidinone

New Jersey Right to Know Hazardous Substance List:

2-(2-Aminoethoxy)ethanol

Pennsylvania Hazardous Substance List:

1-Methyl-2-pyrrolidinone

Section 16 - Other Information

Revision Notes: In Section 9, the boiling point has been revised.

Additional Hazard Rating Systems: None

Disclaimer: While ACSI believes that the data contained herein are factual, and the opinions expressed are of qualified experts regarding the results of tests conducted, the data are not to be taken as warranty or representation for which ACSI assumes legal responsibility. The data are offered solely for consideration, investigation, and verification. Any use of this data and information must be determined by the user to be in accordance with federal, state, and local laws and regulations.